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# **MV500 Series Suck Back Spray Valve**

**Version: 112-10634**

**OWNER'S MANUAL**

**Rev A**

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# 1. Introduction

Before you operate this system, read the operation and setup manual. This will help you to become familiar with the product and ensure successful operation.

If any questions or problems arise, contact PVA's Technical Support department.

## 1.1 PVA Contact Information

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## 1.2 Document History

Revision	Revision Date	Reason for Changes
REV A	March 2018	Initial release, version 112-0634
REV B	April 2018	Basic edits and additional images

***NOTE: All photographs and CAD model representations in this document are a "general representation" of the valve and its components. The actual appearance of the valve and its components can differ based upon customer specific configuration.***

## 1.3 Safety

The machine has warning symbols on it that are related to warnings and notations in this manual. Before you operate the system, identify the warning labels and read the notices described below. Not all labels may be used on any specific system.



*Always wear approved safety glasses when you operate or work with spray or dispense valves.*



*Before you operate the system, read and understand the manuals provided with the unit.*



*Never put hands or tools in areas with this symbol when the machine is in operation. A dangerous condition may exist.*



*Read and understand the manuals provided with the unit before any repairs or maintenance is done. Only a qualified individual should do service.*



*Use caution when there are pressurized vessels. Find and repair any leaks immediately. Always wear appropriate safety equipment when you work with pressurized vessels or vessels that contain chemicals.*



*Shear hazard from moving parts. Avoid contact.*

## 1.4 Personal Protective Equipment

Operators must use eye protection because material contents are under pressure. Always wear gloves to handle materials and solvents. Refer to MSDS sheets on the material being dispensed for other precautions and recommended solvents.

## 1.5 Waste Disposal

Dispose of all used parts and materials in accordance with local laws and regulations.

# 2. Technical Specifications

**Table 1: MV500 Series Technical Specifications**

Weight	Approximately 16oz
Overall Dimensions	6.25"(159mm) x 1.5"(38mm) x 2.33"(59mm)
Wetted Components	Stainless steel, Kalrez®, Teflon® polyurethane
Fluid inlet	1/4" MNPT
Fluid Outlet	Male luer lock adapter
Fluid volume range	0.10cc – 1.45cc per cycle
Recommended viscosity range	1cps – paste
Inlet fluid pressure	30psi – 300psi
Outlet fluid pressure	500psi, maximum generated on outlet
Operating air pressure	80psi. <i>(Can be operated between 50psi – 100psi)</i>
Operating air ports	10-32 Female threaded ports <i>(supplied air fittings for 5/32"od tube)</i>
Operating equipment	2-Position, 4-way air solenoid valve
Optional equipment	24vdc reed switch <i>(Quantity 2)</i>
Mounting dimensions	Refer to drawing 112-10634

## 3. Theory of Operation

The MV500 is a piston style, positive displacement metering head with two integral check valves. The check valves control the flow of material in and out of the valve. The spring-loaded check valve is mounted to the metering cylinder and acts as the inlet check valve and the FC100 series dispense valve acts as the outlet check valve.

The metering chamber has a piston cylinder combination to meter the material. A micrometer on the air section sets the piston's travel distance and controls the chamber volume that will displace a specific fluid volume in each cycle. The FC100 valve is closed when filling and the fluid pressure is used to push the piston up to the micrometer "hard stop". When filled, air pressure is applied to the FC100 to cycle it open and to the upper air section of the metering chamber to push the piston down and dispense fluid out of the valve.

A stroke adjustment on the air section of the FC100 is used to restrict the flow and regulate the fluid dispense rate. The micrometer on the FC100 is used to change the volume of fluid dispensed.

## 4. Setup

The MV500 has a 2-position, 4-way air solenoid valve that actuates the air section. The valve should be operated with clean, dry air between 50-100psi. There are two #10-32 threaded air ports: one on the air section of the FC100 valve and one on the upper air section of the metering chamber. The port furthest from the midsection of the FC100 valve is air to close the valve. The port closest to the middle of the FC100 valve is air to open the valve. The air supply connected to the mid-section of the FC100 valve should be connected to the air section of the metering chamber. Quick connect air fittings are typically supplied with the MV500 to fit 5/32" tubing.

**NOTE:** *The normal position for this valve is closed.*

Fluid is supplied to the MV500 through the 1/4" mnpt inlet check valve located on the inlet of the metering cylinder.

### 4.1 Schematic

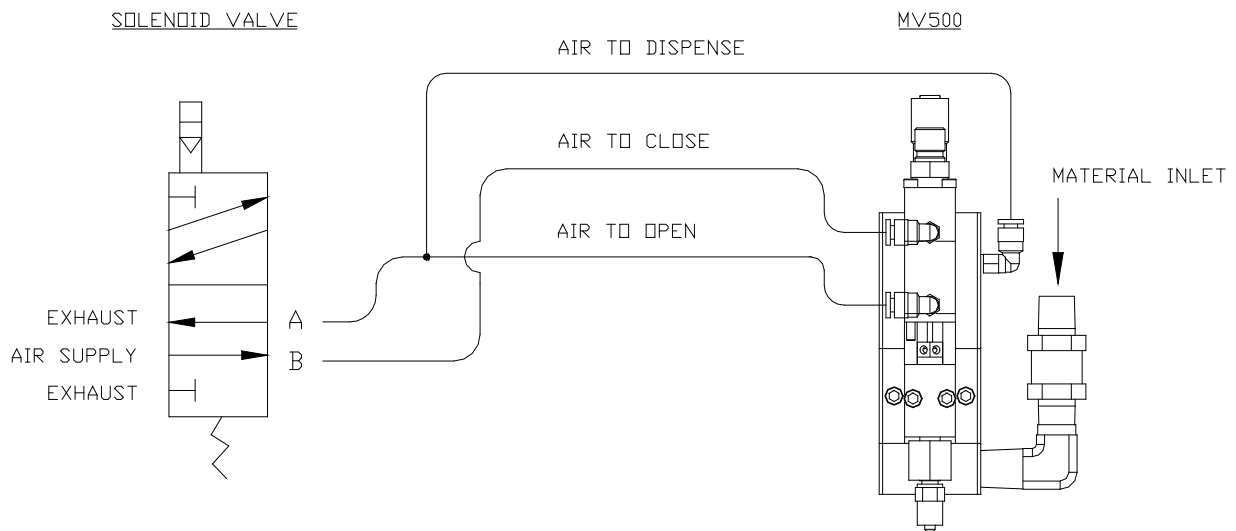


Figure 1: Pneumatic Schematic



## 5. Operation

**NOTE:** Refer to Figure 1.

**NOTE:** Use only compatible solvents and materials or the seals and O-rings will be damaged.

### 5.1 Pneumatics

1. Connect the air lines from solenoid to valve as shown in Figure 1.
2. Supply air pressure to the solenoid valve and set the pressure between 50-100 psi.

**NOTE:** 80 psi is the optimal air pressure setting.

3. Turn the metering piston micrometer counterclockwise until the #3 can be seen on the inside dial.
4. Turn the FC100 stroke adjustment bolt counterclockwise at least two full turns, to open it.
5. Cycle the valve several times. Make sure you can hear the piston hit the micrometer and see the needle of the FC100 going up and down.

### 5.2 Bleed Valve

1. Connect the fluid delivery system to the valve.
2. Increase the fluid pressure to above the minimum operating pressure.
3. Cycle the valve several times with a 1-2 second delay between filling and dispensing until you can see fluid at luer lock outlet.
4. Continue to cycle the valve until there is a steady flow of fluid from the valve outlet with no breaks in the flow and all the air is removed.

## 5.3 Valve Settings

1. The piston refill time is set by the valve inlet fluid pressure. Increase the fluid pressure to increase the fill rate.
2. Use the micrometer to change the dispense volume. Turn the micrometer counterclockwise to increase the volume or clockwise to decrease the volume.



Figure 2: Micrometer

**NOTE:** After each adjustment, cycle the valve and check the new volume.

**NOTE:** Make sure the valve is in the open position when you adjust the micrometer, or the piston can be forced against the micrometer.

3. When you have the necessary volume, turn the micrometer collar clockwise to lock it.



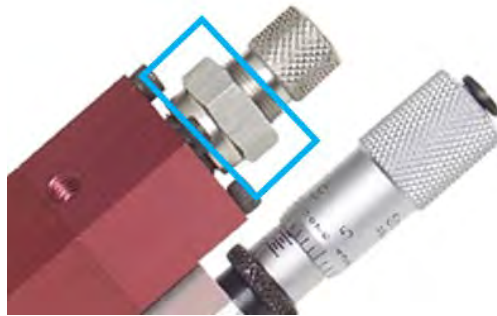
Figure 3: Micrometer Collar

5. Use the FC100 stroke adjustment bolt to change the fluid dispense rate. Turn the stroke adjustment counterclockwise to increase the dispense rate or clockwise to decrease the dispense rate. You may have to loosen the lock nut before you can adjust the stroke adjustment bolt.



**Figure 4: Stroke Adjustment Bolt**

6. Turn the lock nut on the upper air section stroke adjustment clockwise to lock it in place when you have the necessary dispense rate.



**Figure 5: Lock Nut**

6. Install a luer lock dispense nozzle on the valve outlet.

## 5.4 Shutdown

- At the end of the day, remove the luer lock dispense tip and install a luer lock plug.
- Decrease the inlet fluid pressure to the valve to 0 psi.

## 6. Periodic Maintenance

Interval	Action
Daily	<ul style="list-style-type: none"> <li>Examine the material outlet for contamination and cured material. Clean cured material, if necessary.</li> <li>Examine all packing seals for leaks. Tighten packing, if necessary.</li> </ul>
Weekly	<ul style="list-style-type: none"> <li>Examine fluid reservoirs or pumps for cured or dried material.</li> </ul>

### 6.1 Necessary Tools Tool Kit

PVA offers a standard kit of all tools necessary to maintain valve.

Tool Kit part number: **B12-04226**

Quantity	Part Number	Description
2	0266244	8" Adjustabel Wrench
1	26569	9/64" Hex Key
1	26571	5/32" Hex Key
2	26563	3/32" Hex Key
1	26561	5/64" Hex Key
1	26559	1/16" Hex Key
1	5516A18	Tweezers
1	B62-0752	2.5cc Mineral Oil Lubrication Kit
1	B62-2048	2.5cc Silicone Lubricant
1	9570K71	Hook and Pick Set
1	0266255	Pliers
2	53085A61	Soft Plastic Covers for Pliers
1	MM115	Removable Thread Locker
1	TT-14	Teflon Tape, 1/4"

## 6.2 Spare Parts Kit

PVA offers a standard kit of all wearable items to rebuild the valve.

Spare parts kit, part number: **112-10634-SP**

Quantity	Part Number	Description
1	114-5247	Needle
1	V302	Seat
1	V305	Packing, Teflon
1	VLV-212B	O-Ring, Buna
2	VLV-109K	O-Ring, Kalrez
1	VLV-004B	O-Ring, Buna
1	VLV-006K	O-Ring, Kalrez
2	VLV-007B	O-Ring, Buna
2	VLV-014B	O-Ring, Buna
1	VLV-011K	O-Ring, Kalrez
1	112-10641	Lip Seal w/ Kalrez O-Ring
1	V125	Washer
1	VLV-010K	O-Ring, Kalrez
1	VLV-015K	O-Ring, Kalrez
1	4 COS-10-SS	Spring, 10 psi Crack

## 7. Routine Cleaning and Disassembly

Make sure you have a spare parts kit before you disassemble the valve. Discard any damaged or worn components and replace with new parts from the spare parts kit.

1. Decrease all fluid and air pressure to 0 psi.
2. Remove all fluid and air lines from the valve.

### 7.1 Disassemble Sections

For part reference, refer to Figure 58.

1. Use a  $9/64$ " hex key to remove the two machine screws (4) on the FC100.

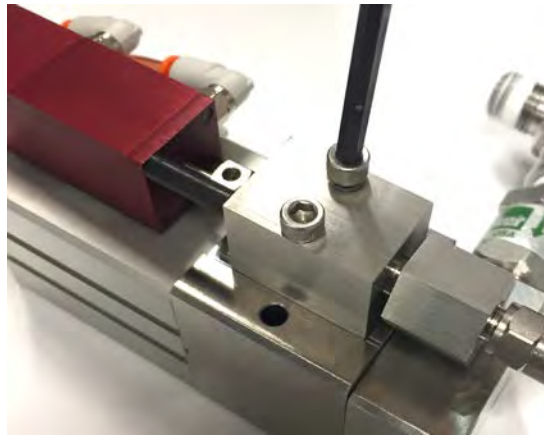


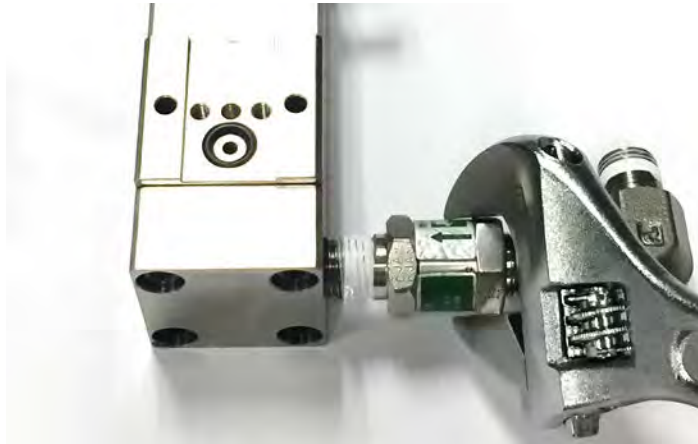
Figure 6: Remove Machine Screws

2. Separate the FC100 (2) from the metering cylinder (1).



Figure 7: Separate the Sections

3. Use an adjustable wrench to loosen and remove the inlet check valve (7).



**Figure 8: Remove the Check Valve**

## 7.2 Disassemble the Metering Cylinder

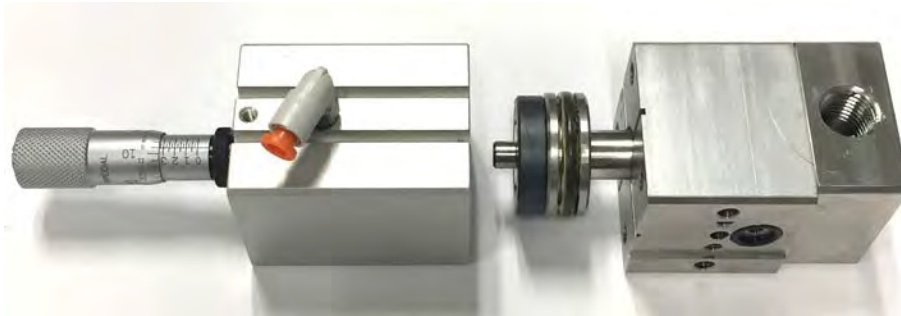
For part reference, refer to Figure 57.

1. Use a 5/32" hex key to remove the four machine screws (10).



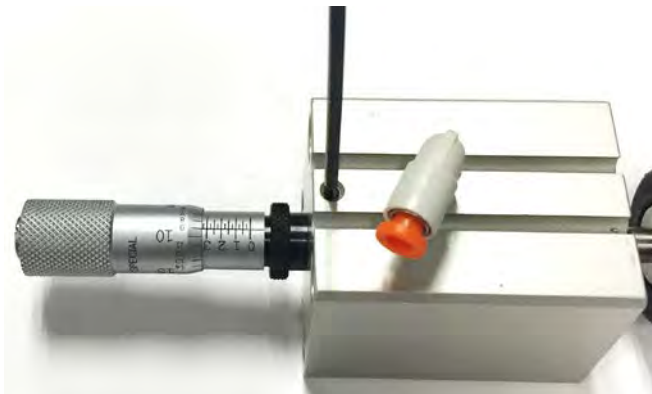
**Figure 9: Remove the Machine Screws**

2. Pull the air body (3) away from the metering cylinder (1) and remove the spring (13).



**Figure 10: Separate the Sections**

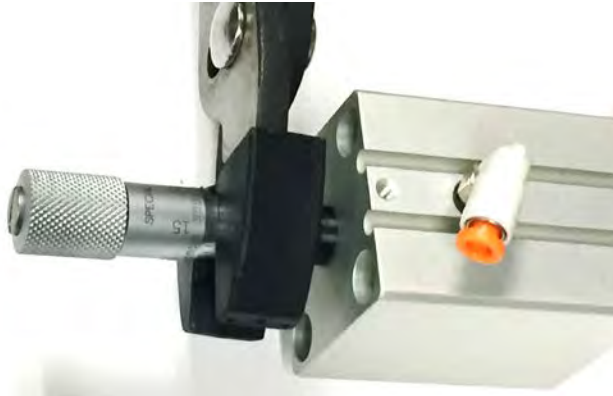
3. Use a 1/16" hex key to loosen the micrometer set screw (12).



**Figure 11: Loosen the Set Screw**

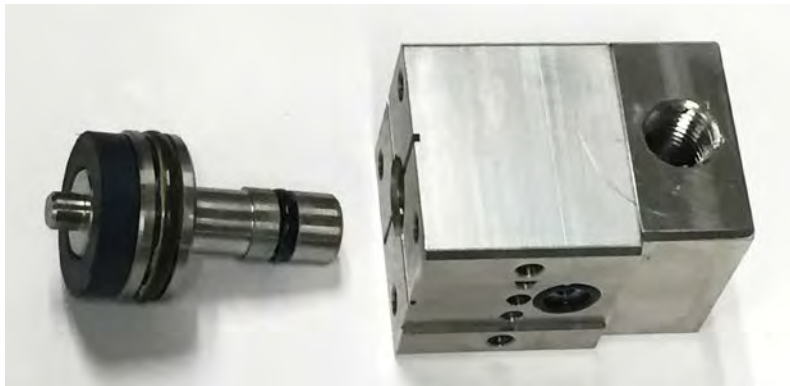


- Use pliers with soft grip covers to loosen and remove the micrometer (5) from the air body (3).



**Figure 12: Remove the Micrometer**

- Remove the micrometer O-ring (7).
- Pull the piston (4) out of the metering cylinder (1).



**Figure 13: Remove the Piston**

- Remove the O-rings (8, 9) and the lip seal assembly (14) from the piston.
- Use a 5/32" hex key to remove the four machine screws (11) and separate the fluid body (2) from the metering cylinder (1).



**Figure 14: Remove the Set Screw**

9. Use a pick to remove the O-ring (9) from the fluid body (2) and the O-ring (6) from the metering cylinder (1).



**Figure 15: Remove the O-Rings**

## 7.3 Disassemble the FC100

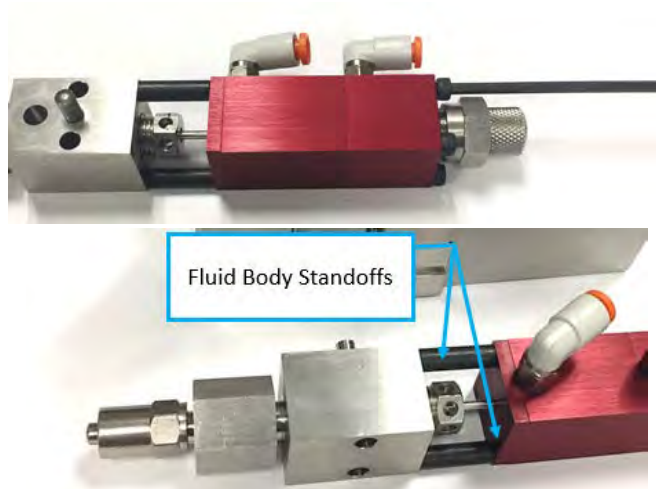
For part reference, refer to Figure 56.

1. Use a 3/32" hex key to turn the packing nut (4) counterclockwise until it is loose.



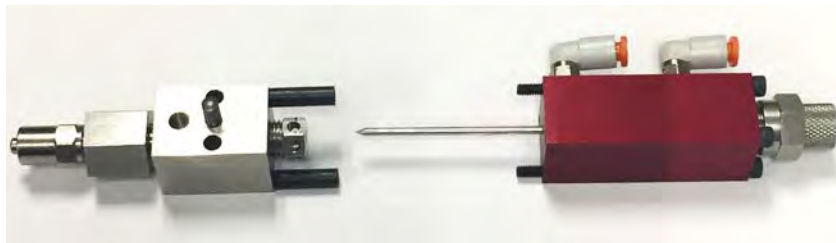
**Figure 16: Loosen the Packing Nut**

2. Use a 3/32" hex key to remove the two machine screws (14) from the upper air body, on the same corners as the fluid body standoffs (1).



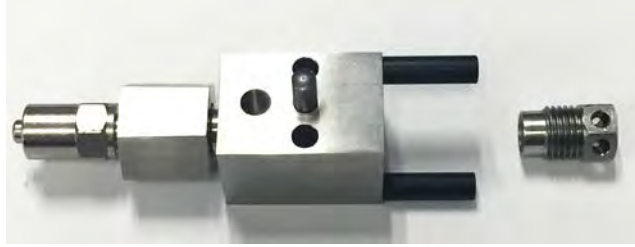
**Figure 17: Loosen Screws**

3. Pull the air section away from the fluid section.



**Figure 18: Separate the Sections**

4. Turn the packing nut (4) counterclockwise to loosen it and remove it from the fluid body (1).



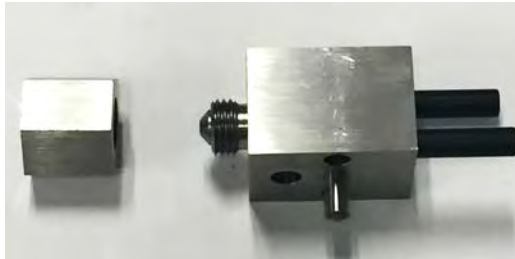
**Figure 19: Remove the Packing**

5. Use an adjustable wrench to loosen and remove the luer adapter (23).
6. Remove the washer (22).



**Figure 20: Remove the Luer Adapter**

7. Use an adjustable wrench to loosen and remove the needle adapter (5).



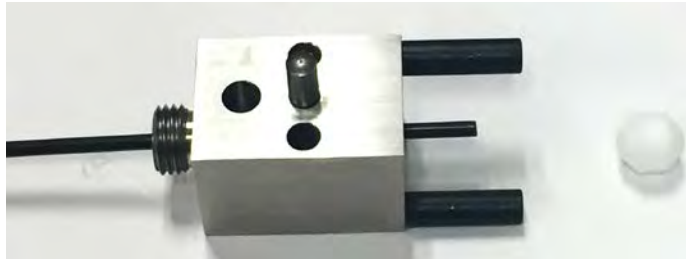
**Figure 21: Remove the Needle Adapter**

8. Use pliers to pull the seat (3) out of the fluid body (1) and remove O-ring (24).



**Figure 22: Remove the Seat**

9. Use a hex key (or similar tool) to push the packing (2) out of the fluid body (1).



**Figure 23: Remove the Packing**

10. Use a 3/32" hex key to remove the two machine screws (15) that hold the air section together. Loosen each screw a few turns at a time until they can be removed.

**NOTE:** *A spring forces these sections apart.*



**Figure 24: Remove the Screws**

11. Separate the sections and remove the spring (16).



**Figure 25: Separate the Sections**

12. Remove the O-ring (17) at the end of the stroke adjuster (12).
13. Turn the stroke adjuster counterclockwise until is loose.
14. Remove the stroke adjuster from the upper air section (11) and remove the O-ring (17).



**Figure 26: Remove the Stroke Adjust**

15. Push the piston and needle assembly (9, 20) out of the lower air section (8).



**Figure 27: Remove the Piston**

16. Pull the end cap (7) off of the lower air body (8) and remove the O-ring (19).



**Figure 28: Remove the End Cap**

17. Use an adjustable wrench and a 1/16" hex key to loosen and remove the set screw (10) from the piston (9).



**Figure 29: Remove the Piston Set Screw**

18. Remove the needle (20) and the O-ring (18) from the piston.



**Figure 30: Remove the Needle and O-ring**

## 8. Assembly Instructions

When you assemble the valve, apply lubricant to all of the O-rings. Use the lubricant in the tool kit or a similar lubricant. Use the removable thread locker from the tool kit, or a similar thread locker, on the set screw (10) of the FC100.

### 8.1 Assemble Metering Cylinder

For part reference, refer to Figure 57.

1. Install the O-ring (9) on fluid body (2).

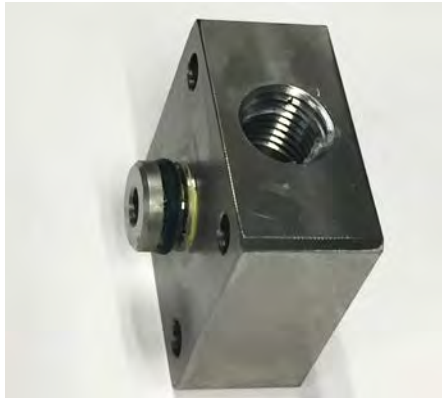


Figure 31: Install the O-Ring

2. Align the fluid body (2) and the metering cylinder (1) with the fluid inlet turned 90° degrees to the left of the fluid outlet.
3. Install the four machine screws (11) and use a 5/32" hex key to tighten them.



Figure 32: Assemble Fluid Body

4. Apply lubricant to the O-rings (8, 9) and install them in the piston (4).
5. Push the lip seal assembly (14) into the bottom of the piston.



**Figure 33: Install the O-Ring Seals**

6. Install the spring (13) into the groove of the metering cylinder (1).
7. Install the piston assembly (4) into metering cylinder. Push the piston assembly in slowly so the O-ring (9) stays installed correctly.



**Figure 26: Assemble the Piston**

8. Apply lubricant to the O-ring (7) and install it on the micrometer (5).
9. Install the micrometer in the air body (3) and use pliers with soft grip covers to turn it clockwise until it is tight.



**Figure 34: Install the Micrometer**

10. Apply removable thread locker to the set screw (12) and install it in the air body. Use a 1/16" hex key to turn it clockwise until it is tight.





**Figure 35: Install the Set Screw**

11. Align the air body (3) on top of fluid assembly with air inlet located on same face as fluid inlet. Use a 5/32" hex key to tighten four machine screws (10).



**Figure 36: Assemble the Air Body**

12. Apply lubricant to the O-ring (6) and install it in the outlet groove of the metering cylinder (1).



**Figure 37: O-Ring Installed**

## 8.2 Assemble FC100 Section

For part reference, refer to Figure 56.

1. Install the lock nut (13) on the stroke adjuster (12) with the hex toward the knurled end of the stroke. Turn the lock nut clockwise until it is tight.
2. Apply lubricant to the O-ring (17) and install it on the inside groove of the stroke adjuster.



**Figure 38: Stroke Adjuster**

3. Install the stroke adjuster (12) into the upper air body (11) and turn it clockwise until it is tight.
4. Install the O-ring (17) on the end of the stroke adjuster.
5. Install the O-ring (18) on the lower air body.



**Figure 39: Assemble the Upper Air Body**

6. Install the needle (20) into the piston (9) and use an adjustable wrench and 1/16" Hex key to tighten.

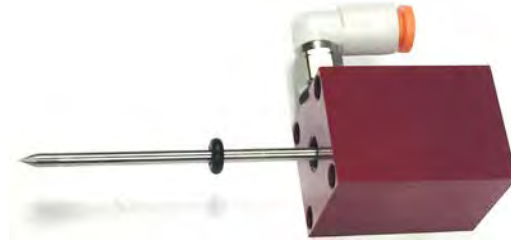


**Figure 40: Piston Install on the Needle**

7. Install the O-ring (18) on the piston.

**NOTE: Use removable thread locker on set screw.**

8. Drop the needle and piston assembly (20, 9) into the lower air body.
9. install an O-ring (19) on the needle.



**Figure 41: Lower Air Body Assembled**

10. Install the end cap (7) on the needle (20) and push it to lower air body (8).



**Figure 42: Air Cap Installed**

11. Put the spring (16) in the lower air body (8) and align and install the upper air body (11).
12. Install the two machine screws (15) and use a 3/32" hex key to tighten. Tighten each screw a few turns at a time so the spring is compressed evenly.



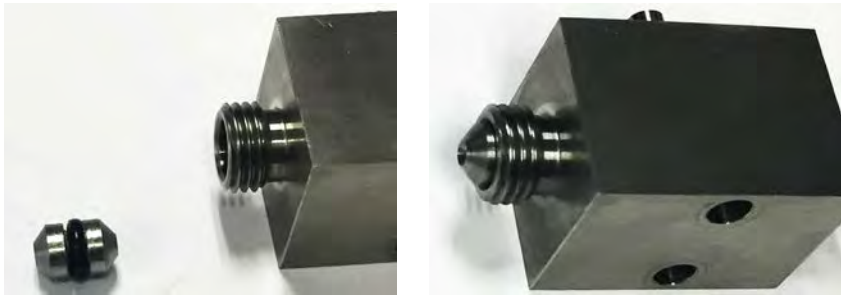
**Figure 43: Assemble the Air Section**

13. Drop the packing (2) into the fluid body (1).
14. Install the packing nut (4) and use your fingers to turn it until it is tight.



**Figure 44: Assemble the Packing and Nut**

15. Apply lubricant to the O-ring (24) and install it on the seat (3).
16. Push the seat into fluid body (1) so it is installed.



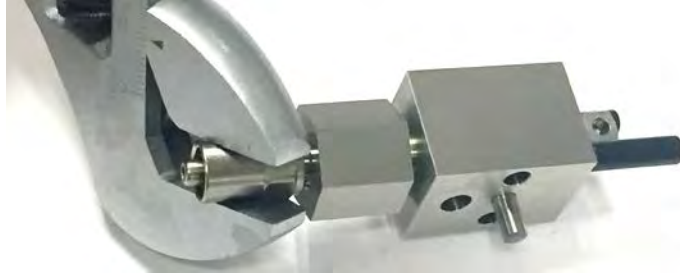
**Figure 45: Install the Seat**

17. Install the needle adapter (5) on the fluid body (1) and use an adjustable wrench to turn it until it is tight.



**Figure 46: Needle Adapter on the Fluid Body**

18. Install the washer (22) in the needle adapter (5).
19. Install the luer adapter (23) on the needle adapter and use an adjustable wrench to turn it until it is tight.



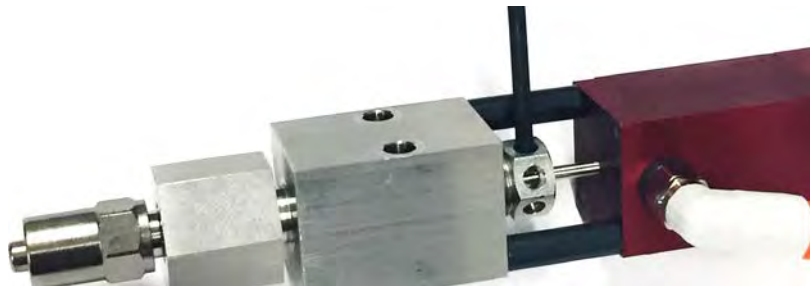
**Figure 47: Install the Seat**

20. Align the air section and the fluid section.
21. Install the needle (20) into the packing nut (4).
22. Align the air ports 90° to the left of the fluid inlet and use the two machine screws (14) to attach the sections. Use a 3/32" hex key to tighten the screws.



**Figure 48: Assemble Valve Sections**

23. Use a 3/32" hex key to turn the packing nut (4) clockwise until it is tight. This keeps the Teflon packing (2) correctly installed.

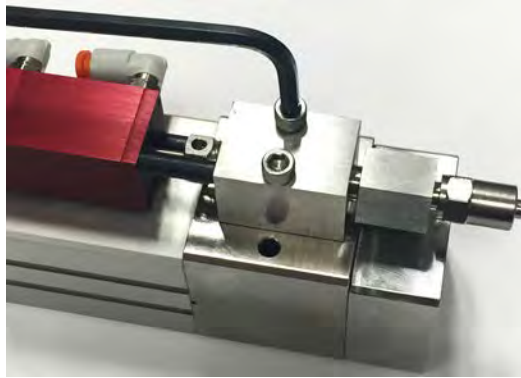


**Figure 49: Tighten the Packing Nut**

## 8.3 Assemble Sections

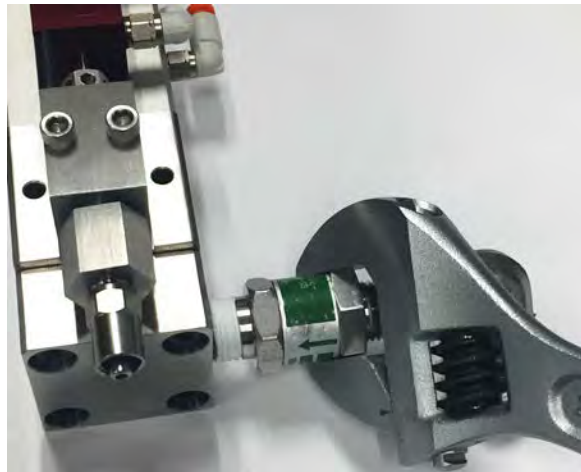
For part reference, refer to Figure 58.

1. Install the FC100 section (2) on the metering cylinder section (1) and install two machine screws (4). Use a 9/64" hex key to tighten the screws.



**Figure 50: Assemble the Sections**

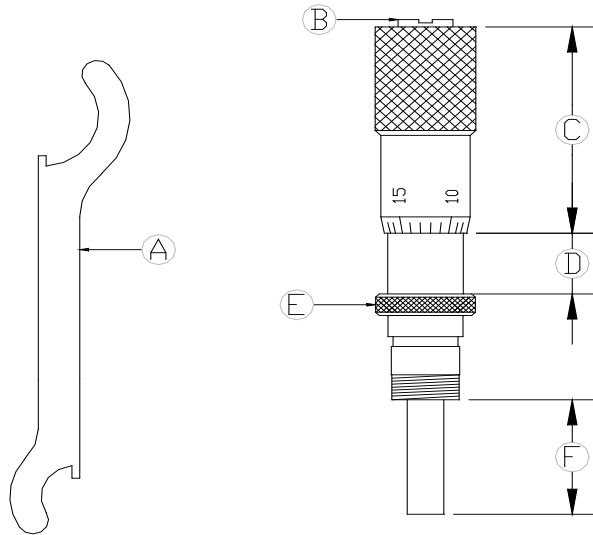
2. Apply Teflon tape to the male threads of the inlet check valve (7) and install it in the metering cylinder (1). Use an adjustable wrench to turn the check valve until tight.



**Figure 51: Tighten the Check Valve**

## 9. Set the Micrometer to Zero

After the valve is assembled it is necessary to set the micrometer to zero.



**Figure 52: Micrometer**

1. Put the inside tip of the small end of the micrometer wrench (A) into the orifice of the micrometer midsection (D) and turn it clockwise until the numbered centerline is on the side that can be easily seen by the operator.



**Figure 53: Micrometer Tool**

2. Turn the dial (C) clockwise until the end (F) bottoms out on the valve piston.
3. Use soft tip pliers to hold the knurled end of the dial (C) tightly. Use a flat head screw driver to loosen the screw (B) 3-4 turns.



Figure 54: Soft Jaw Pliers and Screw Driver

**NOTE:** *It is not necessary to remove the screw.*

4. Use a soft dead blow hammer to tap the dial (C) of the micrometer adjust to unlock it from the midsection (D). The dial should spin freely.
5. Rotate the dial (C) to align the zero mark of the dial with the numbered centerline of the midsection (D), push down firmly to lock the dial in place.



Figure 55: Align the Zero with the Centerline

6. Hold the dial (C) tight in one hand to make sure the zero mark and numbered centerline stay aligned and use the flat head screwdriver to tighten the screw (B) to lock the micrometer adjustment.



## 9.1 Assembly Drawings

ITEM	PART NUMBER	DESCRIPTION	REV	QTY	MANUFACTURER
1	Z14-2822	FLUID BODY	B	1	MS
2	V305	PACKING	D	1	MS
3	V302	SEAT	H	1	MS
4	V306	PACKING NUT	D	1	MS
5	V301	NEEDLE ADAPTER	F	1	MS
6	DOW-4MM18MM	DOWEL PIN	H	1	MCMASTER
7	V200	END CAP	H	1	MS
8	V201	LOWER AIR BODY	G	1	MS
9	V202	PISTON	F	1	MS
10	V001	SETScrew	F	1	BULK
11	V228	UPPER AIR BODY	B	1	MS
12	V230	STROKE ADJUSTER	D	1	MS
13	V229	LOCK NUT	B	1	MS
14	SHS-001225	FASTENER, #5-40 x 2.25*		2	BULK
15	SHS-0012	FASTENER, #5-40 x 2.00*		2	BULK
16	V030	SPRING	A	1	CENTURY SPRING
17	VLV-0088	O-RING, -008, BUIMA-N		2	BULK
18	VLV-0148	O-RING, -014, BUIMA-N		2	BULK
19	VLV-0048	O-RING, -004, BUIMA-N		1	BULK
20	114-5247	NEEDLE	C	1	PRECISION PUNCH
21	RJL03-32	FITTING, 5/32 TUBE		2	SMC
22	V125	WASHER		1	BULK
23	V300	LUER ADAPTER		1	MICROGROUP
24	VLV-008F	O-RING, -008, BALREZ		1	BULK

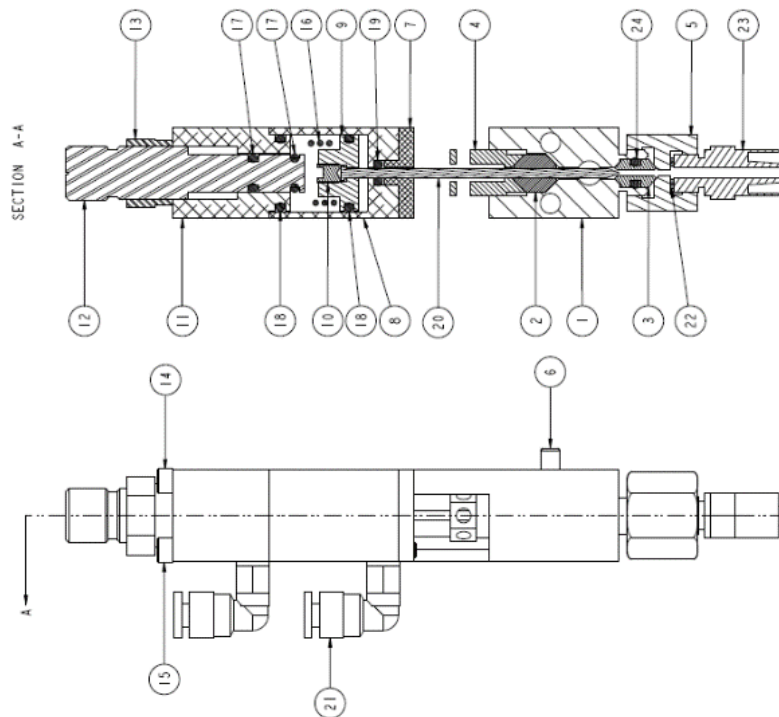


Figure 56: FC100 112-2971

ITEM	PART NUMBER	DESCRIPTION	REV	QTY	MANUFACTURER
1	214-15356	METERING CYLINDER	B	1	MS
2	114-8986	FLUID BODY	B	1	MS
3	114-8983	AIR BODY	C	1	MS
4	112-10633	PISTON ASSEMBLY	A	1	ASSEMBLY
5	463-MICRO	MICROMETER HEAD		1	STARBUETT
6	VLV-01IK	O-RING, -01I, KALREZ		1	BULK
7	VLV-007B	O-RING, -007, BUNA-N		1	BULK
8	VLV-212B	O-RING, -212, BUNA-N		1	BULK
9	VLV-103K	O-RING, -103, KALREZ		2	BULK
10	SHCS10-32X200	SHCS, #10-32 x 2"		4	BULK
11	SHCS10-32X150	SHCS, #10-32 x 3/4"		4	BULK
12	01515	SET SCREW, #5-40 X 0.50"		1	BULK
13	V080	SPRING		1	CENTURY SPRING
14	112-10641	LIP SEAL ASSEMBLY	A	1	ASSEMBLY

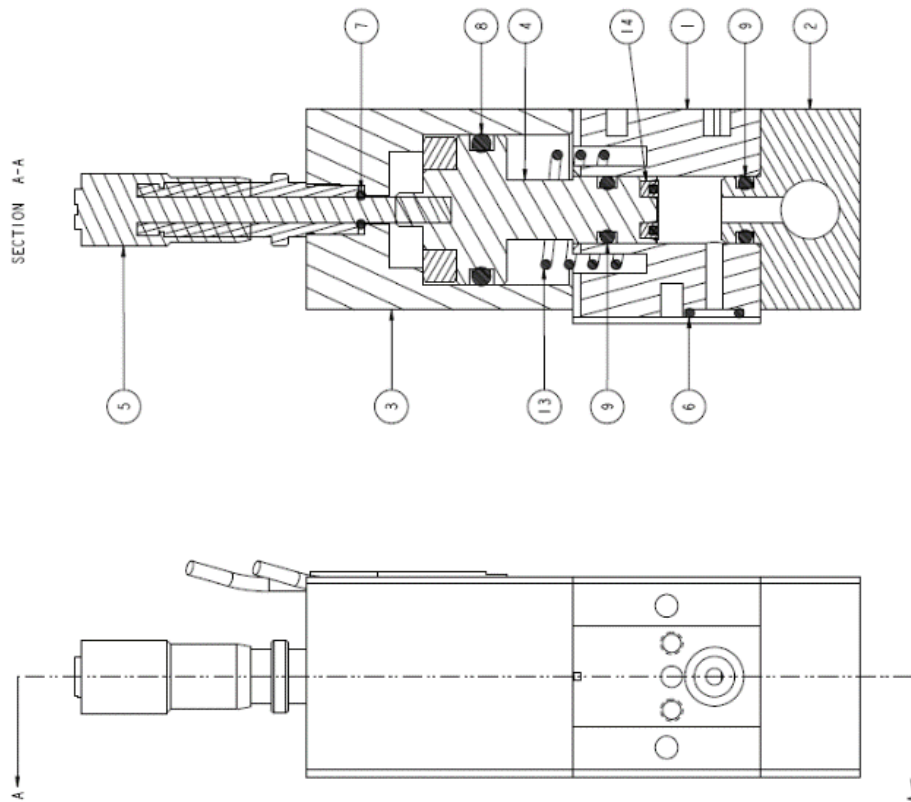


Figure 57: Metering Cylinder

ITEM	PART NUMBER	DESCRIPTION	REV	QTY	MANUFACTURER
1	112-10632	MV500 METERING CYLINDER	A	1	ASSEMBLY
2	112-2971	FC100 - FACE SEAL	B	1	ASSEMBLY
3	KJL03-32	FITTING, 5/32 TUBE		1	SMC
4	SHCS8-32X1000	SHCS, #8-32 x 1"		2	BULK
5	SHCS8-32X1875	SHCS, #8-32 x 1 7/8"		2	BULK
6	I-4CD-SS	FITTING, 1/4 CD, SS		1	PARKER
7	4M-C04L-10-K7-SS	CHECK VALVE, 10PSI CRACK, 3/16" BORE		1	PARKER

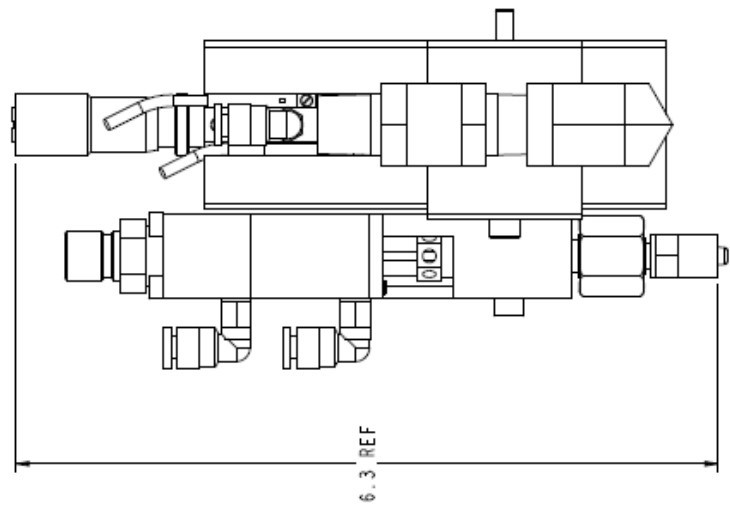
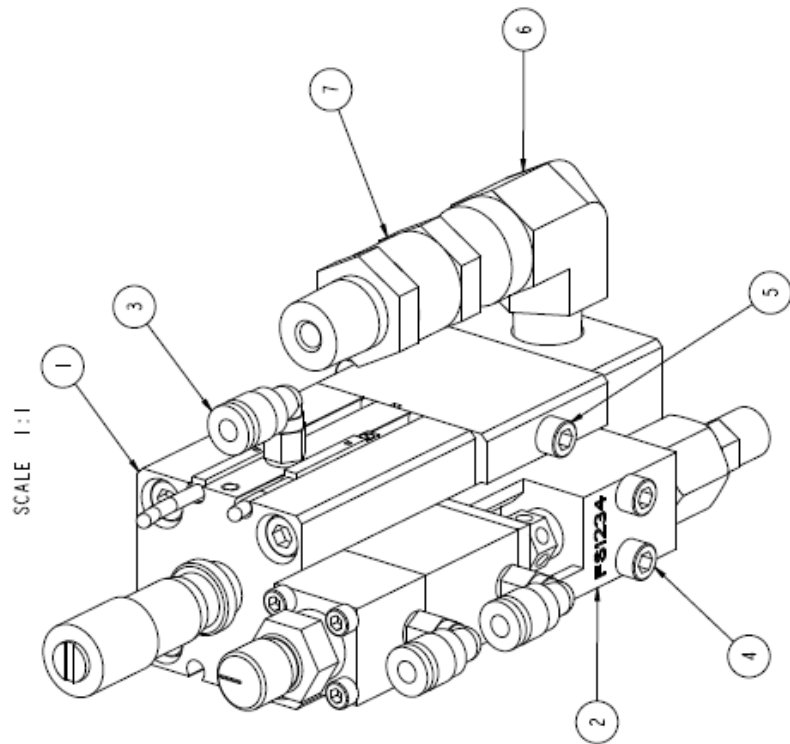


Figure 58: Metering Cylinder and FC100 Assembly

## 10. Troubleshooting

Troubleshooting Problem	Possible Cause	Corrective Action
Valve does not cycle	<ul style="list-style-type: none"> <li>The air pressure to the air section is too low</li> <li>Material is cured in the valve</li> <li>The O-rings were not lubricated when the valve was assembled</li> </ul>	<ul style="list-style-type: none"> <li>Increase the air pressure to 60-100 psi</li> <li>Disassemble and clean the valve</li> <li>Disassemble the valve, lubricate the O-rings and seals, and assemble the valve again</li> </ul>
Valve does not dispense material	<ul style="list-style-type: none"> <li>The fluid pressure is too low</li> <li>Material is cured in the fluid section</li> <li>The micrometer is set too low</li> </ul>	<ul style="list-style-type: none"> <li>Increase the fluid pressure</li> <li>Disassemble and clean the valve</li> <li>Increase the micrometer setting</li> </ul>
Valve leaks from the tip	<ul style="list-style-type: none"> <li>The needle and seat are worn</li> <li>There is air trapped in the fluid section</li> </ul>	<ul style="list-style-type: none"> <li>Replace parts as necessary</li> <li>Turn the valve upside down and cycle until all the air is released</li> </ul>
Dispense rate too fast	<ul style="list-style-type: none"> <li>The stroke adjustment is set too far open</li> </ul>	<ul style="list-style-type: none"> <li>Turn the stroke adjustment clockwise</li> </ul>
Dispense rate too slow	<ul style="list-style-type: none"> <li>The stroke adjustment is set too low</li> </ul>	<ul style="list-style-type: none"> <li>Turn the stroke adjustment counterclockwise</li> </ul>
There are air bubbles in fluid	<ul style="list-style-type: none"> <li>The valve was not correctly bled</li> <li>There is a problem with the Fluid delivery system</li> </ul>	<ul style="list-style-type: none"> <li>Bleed the valve and turn the valve upside down and cycle until the air is released</li> <li>Diagnose and repair</li> </ul>

# 11. Warranty

## PVA Warranty Policy

PVA warrants the enclosed product against defects in material or workmanship on all components for one year from the date of shipment.

The warranty does not extend to components damaged due to misuse, negligence, or installation and operation that are not in accordance with the recommended factory instructions. Unauthorized repair or modification of the enclosed product, and/or the use of spare parts not directly obtained from PVA (or from factory authorized dealers) will void all warranties.

All PVA warranties extend only to the original purchaser. Third party warranty claims will not be honored at any time.

Prior to returning a product for a warranty claim, a return authorization must be obtained from PVA's Technical Support department. Authorization will be issued either via the telephone, facsimile, or in writing upon your request.

To qualify as a valid warranty claim, the defective product must be returned to the factory during the warranty period. Upon return, PVA will repair (or replace) all components found to be defective in material or workmanship.

(Retain this for your records)

### Product Information:

PRODUCT: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

DATE OF PURCHASE: \_\_\_\_\_

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